

DISASTER MANAGEMENT CYCLE – A THEORETICAL APPROACH

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Abstract:

The present study explains the various concepts used in disaster management. The concepts explained include: Disaster, Hazard, Vulnerability, Capacity, Risk and Disaster Management Cycle. In addition to the terminologies, the study also seeks to explain various types of disasters.

Keywords: natural hazards, disaster management, risk management

Introduction

Disaster is a sudden adverse or unfortunate extreme event which causes great damage to human beings as well as plants and animals. Disasters occur rapidly, instantaneously and indiscriminately. These extreme events either natural or man-induced exceed the tolerable magnitude within or beyond certain time limits, make adjustment difficult, result in catastrophic losses of property and income and life is paralyzed. These events which occur aggravate natural environmental processes to cause disasters to human society such as sudden tectonic movements leading to earthquake and volcanic eruptions, continued dry conditions leading to prolonged droughts, floods, atmospheric disturbances, collision of celestial bodies, etc. (Joshi, 2008).

Disasters have always co-existed with civilizations. With technological advancement, development initiatives resulted in the creation of a lot of infrastructure and permanent assets. Gradually material development detached man from nature on one hand, and increased vulnerability of the human population, on the other. The progressive increase in loss of life,

property and deleterious effect on environment due to disasters moved the international community to look at disaster management in a new perspective, which transcends international barriers, anticipates possible threats and enables tackling of disasters from the pre-stage. The last decade (1990-1999) was observed by the International Community as the “International Decade for natural disaster reduction”, a decade dedicated to promoting solutions to reduce risks from natural hazards. The international dimension of disasters was realized and a protocol sought to be established so that when it comes to suffering of humanity, help from the International community flow in right earnest.

Almost everyday, newspapers, radio and television channels carry reports on disaster striking several parts of the world. But what is a disaster? The term disaster owes its origin to the French word “Desastre” which is a combination of two words ‘des’ meaning bad and ‘aster’ meaning star. Thus the term refers to ‘Bad or Evil star’. The United Nations defined Disasters as ‘A serious disruption of the functioning of a community or a society causing widespread human, material, economic

and environmental losses which exceed the ability of the affected community/society to cope using its own resources' (UNDP, nd).

A disaster is a result from the combination of hazard, vulnerability and insufficient capacity or measures to

reduce the potential chances of risk. A disaster happens when a hazard impacts on the vulnerable population and causes damage, casualties and disruption. Figure 1 gives a better illustration of what a disaster is.

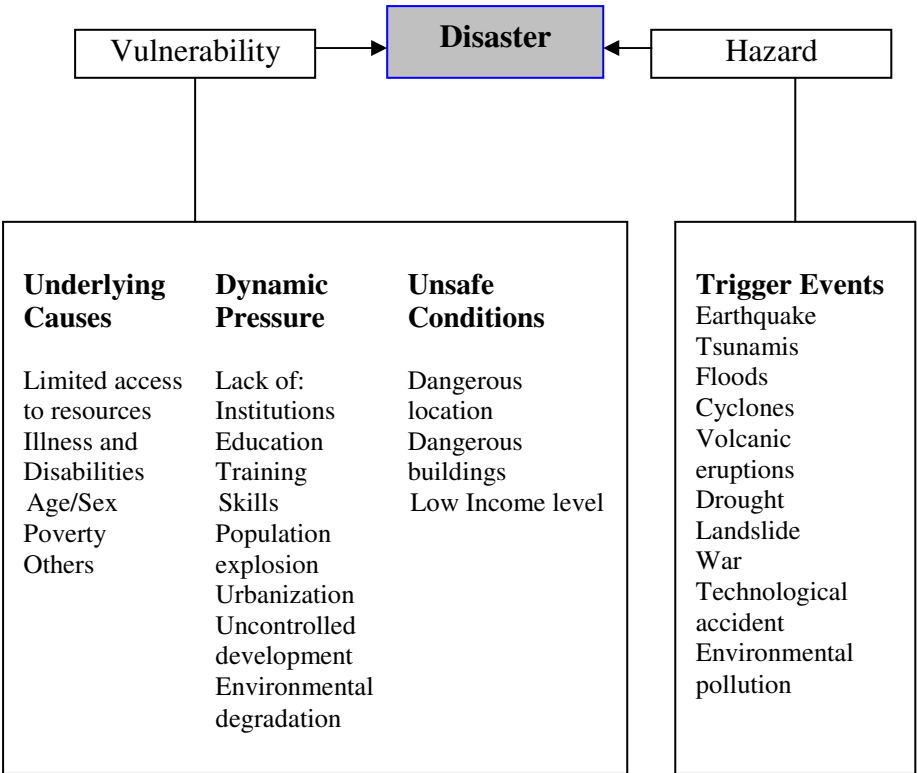


Figure 1. What is a disaster?

Any hazard – flood, earthquake or cyclone which is a triggering event along with greater vulnerability (inadequate access to resources, sick and old people, lack of awareness etc) would lead to disaster causing greater loss to life and property. For example; an earthquake in an uninhabited desert cannot be considered a disaster, no matter how strong the intensities produced. An earthquake is disastrous only when it affects people, their

properties and activities. Thus, disaster occurs only when hazards and vulnerability meet. But it is also to be noted that with greater capacity of the individual/community and environment to face these disasters, the impact of a hazard reduces. Therefore, we need to understand the three major components namely hazard, vulnerability and capacity with suitable examples to have a basic understanding of disaster management.

Main components of disaster management

What is a Hazard?

Hazard may be defined as “a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment.” Hazards can be grouped into two broad categories namely natural and manmade.

Natural hazards are hazards which are caused because of natural phenomena (hazards with meteorological, geological or even biological origin). Examples of natural hazards are cyclones, tsunamis, earthquake and volcanic eruptions

which are exclusively of natural origin. Landslides, floods, drought, fires are socio-natural hazards since their causes are both natural and man made. For example flooding may be caused because of heavy rains, landslide or blocking of drains with human waste.

Manmade hazards are hazards which are due to human negligence. Manmade hazards are associated with industries or energy generation facilities and include explosions, leakage of toxic waste, pollution, dam failure, wars or civil strife, etc. The list of hazards is very long. Many occur frequently while others take place occasionally. However, on the basis of their genesis, they can be categorized as follows:

Table 1

Various Types of Hazards

Type	Hazards	
Geological Hazards	1. Earthquake 2. Tsunami 3. Volcanic eruption	4. Landslide 5. Dam burst 6. Mine Fire
Water & Climatic Hazards	1. Tropical Cyclone 2. Tornado and Hurricane 3. Floods 4. Drought 5. Hailstorm	6. Cloudburst 7. Landslide 8. Heat & Cold wave 9. Snow Avalanche 10. Sea erosion
Environmental Hazards Biological	1. Environmental pollutions 2. Deforestation 1. Human / Animal Epidemics 2. Pest attacks	3. Desertification 4. Pest Infection 3. Food poisoning 4. Weapons of Mass Destruction
Chemical, Industrial and Nuclear Accidents	1. Chemical disasters 2. Industrial disasters	3. Oil spills/Fires 4. Nuclear
Accident related	1. Boat / Road / Train accidents / air crash Rural / Urban fires Bomb /serial bomb disasters blasts 2. Forest fires	3. Building collapse 4. Electric Accidents 5. Festival related 6. Mine flooding

Source: CBSE (2006)

What is Vulnerability?

Vulnerability may be defined as “The extent to which a community, structure, services or geographic area is likely to be damaged or disrupted by the impact of particular hazard, on account

of their nature, construction and proximity to hazardous terrains or a disaster prone area.”

Vulnerabilities can be categorized into physical and socio-economic vulnerability. Physical Vulnerability: It

includes notions of whom and what may be damaged or destroyed by natural hazard such as earthquakes or floods. It is based on the physical condition of people and elements at risk, such as buildings, infrastructure etc; and their proximity, location and nature of the hazard. It also relates to the technical capability of building and structures to resist the forces acting upon them during a hazard event.

Socio-economic Vulnerability

The degree to which a population is affected by a hazard will not merely lie in the physical components of vulnerability but also on the socioeconomic conditions. The socio-economic conditions of the people also determine the intensity of the impact. For example, people who are poor and living in the sea coast don't have the money to construct strong concrete houses. They are generally at risk and lose their shelters when ever there is strong wind or cyclone. Because of their poverty they too are not able to rebuild their houses.

What is Capacity?

Capacity can be defined as "resources, means and strengths which exist in households and communities and which enable them to cope with, withstand, prepare for, prevent, mitigate or quickly recover from a disaster". People's capacity can also be taken into account. Capacities could be classified into physical and socio-economic capacities.

Physical Capacity: People whose houses have been destroyed by the cyclone or crops have been destroyed by the flood can salvage things from their homes and from their farms. Some family members have skills, which enable them to find employment if they migrate, either temporarily or permanently.

Socio-economic Capacity: In most of the disasters, people suffer their greatest losses in the physical and

material realm. Rich people have the capacity to recover soon because of their wealth. In fact, they are seldom hit by disasters because they live in safe areas and their houses are built with stronger materials. However, even when everything is destroyed they have the capacity to cope up with it.

Hazards are always prevalent, but the hazard becomes a disaster only when the frequency or likelihood of a hazard and the vulnerability of the community increases the risk of being severely affected.

What is Risk?

Risk is a "measure of the expected losses due to a hazard event occurring in a given area over a specific time period. Risk is a function of the probability of particular hazardous event and the losses it would cause." The level of risk depends upon:

- Nature of the hazard;
- Vulnerability of the elements which are affected;
- Economic value of those elements.

A community/locality is said to be at 'risk' when it is exposed to hazards and is likely to be adversely affected by its impact. Whenever we discuss 'disaster management' it is basically 'disaster risk management'. Disaster risk management includes all measures which reduce disaster related losses of life, property or assets by either reducing the hazard or vulnerability of the elements at risk.

Disaster Management Cycle

Disaster Risk Management includes sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses. The three key stages of activities that are taken up within disaster risk management are as follows (See Figure 2):



Figure 2. Disaster Management

1. *Before a disaster (pre-disaster).* Pre-disaster activities those which are taken to reduce human and property losses caused by a potential hazard. For example, carrying out awareness campaigns, strengthening the existing weak structures, preparation of the disaster management plans at household and community level, etc. Such risk reduction measures taken under this stage are termed as mitigation and preparedness activities.

2. *During a disaster (disaster occurrence).* These include initiatives taken to ensure that the needs and provisions of victims are met and suffering is minimized. Activities taken under this stage are called emergency response activities.

3. *After a disaster (post-disaster).* There are initiatives taken in response to a disaster with a purpose to achieve early recovery and rehabilitation of affected communities, immediately after a disaster strikes. These are called as response and recovery activities.

The Disaster risk management cycle diagram (DRMC) highlights the range of initiatives which normally occur during both the Emergency response and Recovery stages of a disaster. Some of these cut across both stages (such things as coordination and the provision of ongoing assistance); whilst other activities are unique to each stage (e.g. Early Warning and Evacuation during Emergency Response; and Reconstruction and Economic and

Social Recovery as part of Recovery). The DRMC also highlights the role of the media, where there is a strong relationship between this and funding opportunities. This diagram works best for relatively sudden-onset disasters, such as floods, earthquakes, bushfires, tsunamis, cyclones etc, but is less reflective of slow-onset disasters, such as drought, where there is no obviously recognizable single event which triggers the movement into the Emergency Response stage.

According to Warfield (2008) disaster management aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery. The disaster management cycle illustrates the ongoing process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Appropriate actions at all points in the cycle lead to greater preparedness, better warnings, reduced vulnerability or the prevention of disasters during the next iteration of the cycle. The complete disaster management cycle includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure.

The mitigation and preparedness phases occur as disaster management improvements are made in anticipation of a disaster event. Developmental considerations play a key role in contributing to the mitigation and preparation of a community to effectively confront a disaster. As a disaster occurs, disaster management

actors, in particular humanitarian organizations become involved in the immediate response and long-term recovery phases. The four disaster management phases illustrated here do not always, or even generally, occur in isolation or in this precise order. Often phases of the cycle overlap and the length of each phase greatly depends on the severity of the disaster.

- Mitigation - Minimizing the effects of disaster. Examples: building codes and zoning; vulnerability analyses; public education.
- Preparedness - Planning how to respond. Examples: preparedness plans; emergency exercises/training; warning systems.
- Response - Efforts to minimize the hazards created by a disaster. Examples: search and rescue; emergency relief.
- Recovery - Returning the community to normal. Examples: temporary housing; grants; medical care.

To analyze the scope of disaster management in the revised context, it should be studied the cycle of the phenomenon (Figure 3).

Disasters are as old as human history but the dramatic increase and the damage caused by them in the recent past have become a cause of national and international concern. Over the past decade, the number of natural and manmade disasters has climbed inexorably. From 1994 to 1998, reported disasters average was 428 per year but from 1999 to 2003, this figure went up to an average of 707 disaster events per year. Figure 4 presents the deadliest disasters of the decade (1992 – 2001).

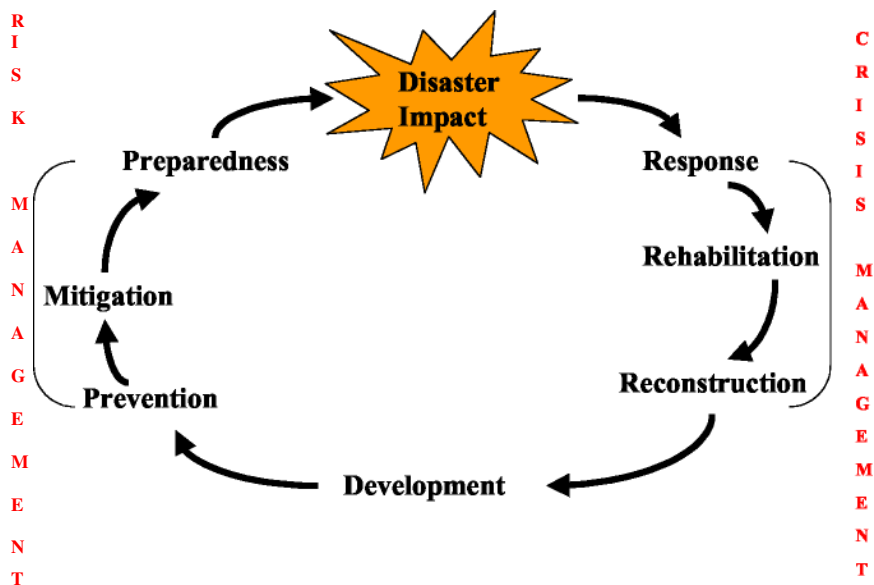


Figure 3. Disaster Management Cycle

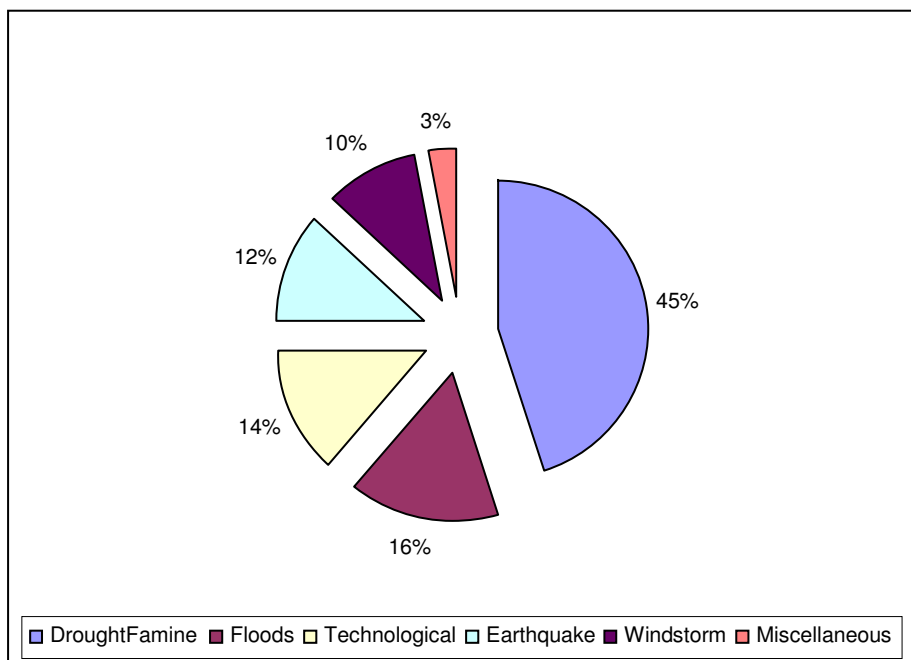


Figure 4. Reported Deaths from all Disasters: World Scenario (1992-2001)

Drought and famine have proved to be the deadliest disasters globally (45%), followed by floods (16%), technological disaster (14%), earthquake (12%), windstorm (10%),

extreme temperature and others (3%). Global economic loss related to disaster events average around US \$880 billion per year (CBSE, 2006).

Conclusions

There has been a dramatic increase in disasters and the damages caused by them in the recent past. Over the past decade, the number of natural and manmade disasters has climbed inexorably. Accordingly to the statistics, the number of disasters per year increased with 60% in the period 1999-2001 in comparison with the previous period, 1994 -1998. The highest increase was in the countries of low human development, which registered an increase of 142%.

In these countries, the responsible institutions should play an important role but, in general, the disaster management policy responses are influenced by methods and tools for cost-effective and sustainable interventions.

There are no long-term, inclusive and coherent institutional arrangements to address disaster issues with a long-term vision. Disasters are viewed in isolation from the processes of

mainstream development and poverty alleviation planning. For example, disaster management, development planning and environmental management institutions operate in isolation and integrated planning between these sectors is almost lacking.

Absence of a central authority for integrated disaster management and lack of coordination within and between disaster related organizations is responsible for effective and efficient disaster management. State-level disaster preparedness and mitigation measures are heavily tilted towards structural aspects and undermine non-structural elements such as the knowledge and capacities of local people, and the related livelihood protection issues.

In conclusion, with a greater capacity of the individual/community and environment to face the disasters, the impact of a hazard would be reduced.

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